

Under the Big Sky e-Letter

May & June 2017



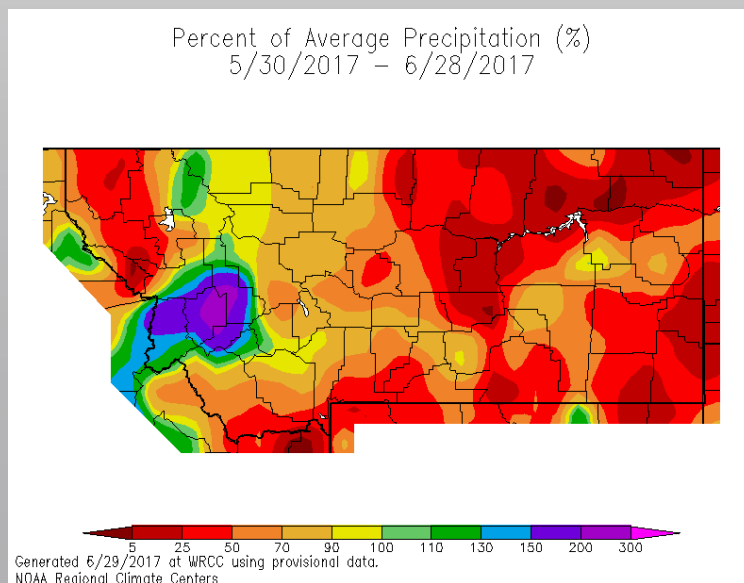
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How Dry It's Been (Table from Greg Forrester, Lead Forecaster: 2017 has featured the driest end of January through June on record for Glasgow, MT! And here's the top 10 (driest):

Rank	Value	Ending Date
1	2.75	2017-06-30
2	3.27	1983-06-30
3	3.33	1931-06-30
4	3.35	1918-06-30
5	3.42	1958-06-30
6	3.48	1990-06-30
7	3.52	1968-06-30
8	3.53	2009-06-30
9	3.55	1937-06-30
10	3.60	1949-06-30

30 Day Percent of Normal Precipitation (Montana)



The extent of how dry it has been is the one thing that stands out in this map depicting portions of northeast Montana receiving 5 to 25 percent of normal precipitation over the previous 30 day period. The on-going drought has prompted fireworks bans for parts of the area for the 4th of July celebration this year, as well as a variety of other important impacts which include burn bans and fire restrictions.

Figure 1: 30-Day Percent of Normal Precipitation.

CPC Three Month Outlook: The Climate Prediction Center released its three month outlook for temperature and precipitation for July through September on June 15, 2017. The three month outlook calls for an equal chance for above or below normal temperatures for most of Montana. Expectations are for above normal precipitation for the next three months, though that has been the case for several months and this has not come to fruition. Therefore, while there is always hope that conditions will improve, these outlooks should be taken with a grain of salt and those with interests in the area should make considerations should the drought situation continue to worsen in the coming months. The latest outlook is always available [here](#) for anyone curious about additional details.



Figure 2: Climate Prediction Center three month temperature (left) and precipitation (right) outlook for July through September 2017.

Updated U.S. Drought Monitor: The [latest U.S. Drought Monitor](#) was released on Thursday June 29, 2017. The Drought Monitor now shows severe to extreme drought across portions of northeast Montana due to the extensive dry period that has taken place across the area. Patchy locations of abnormally dry to moderate drought conditions are also occurring across the Western U.S. A great portion of the western U.S., however, is presently drought free.

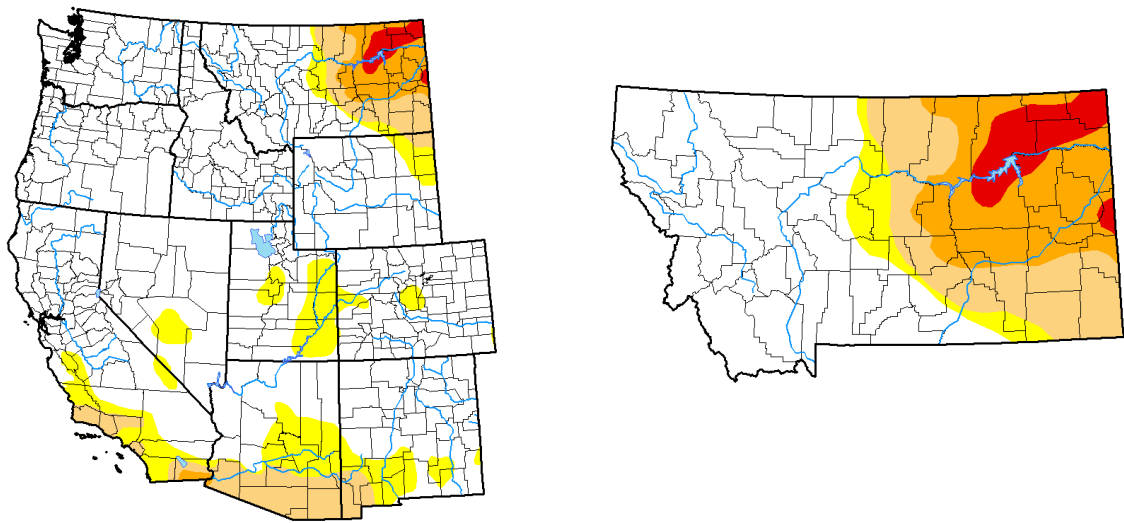


Figure 3: Latest Drought Monitor for the western U.S. (left) and Montana (right) released Thursday June 29 2017.

U.S. & Global Climate Highlights (April): The latest [U.S.](#) and [global](#) climate highlights for April 2017 are now available. A few points for you to take home are provided below.

U.S. Selected Significant Climate Anomalies and Events for April 2017

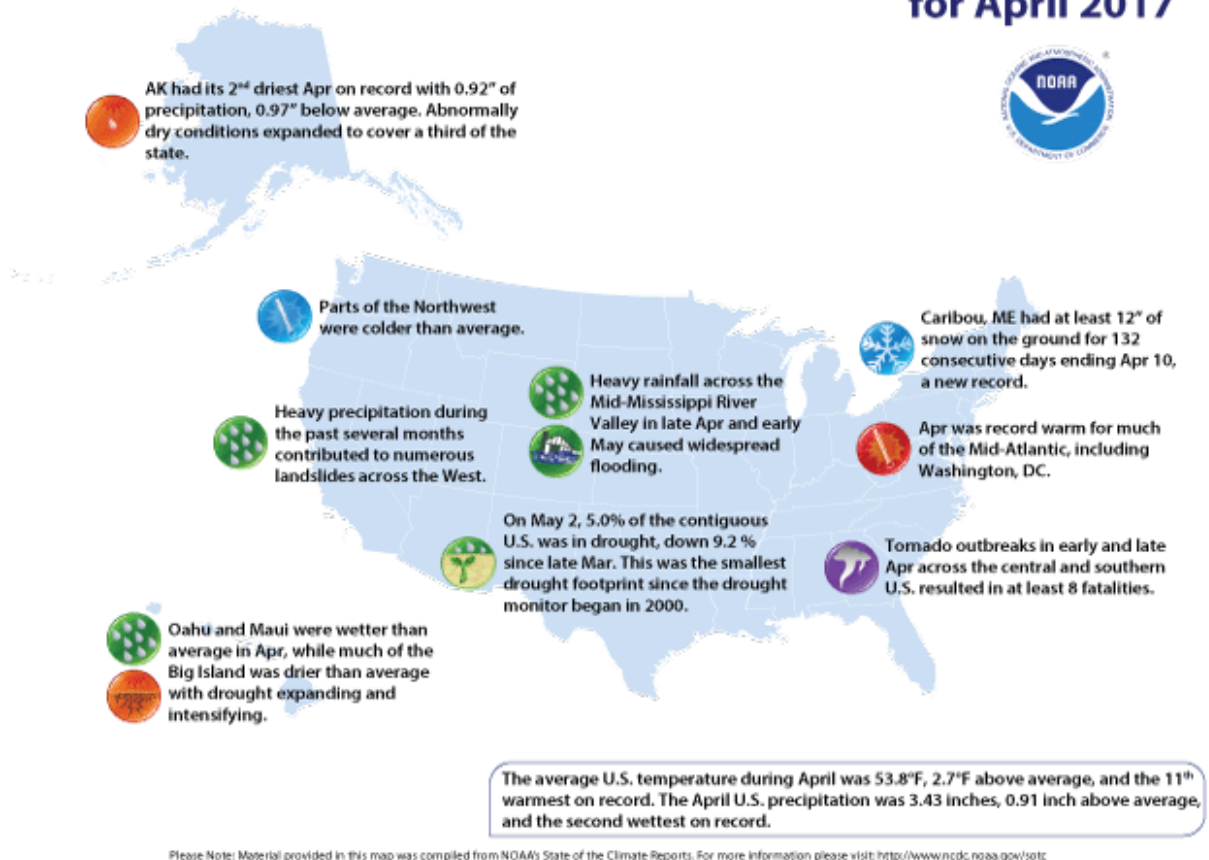


Figure 4: Highlights of U.S. climate events for April 2017.

U.S. Highlights for April 2017

- 1) The contiguous U.S. average temperature for April 2017 was 53.8 °F, the 11th warmest on record.
- 2) The average April precipitation total for the contiguous U.S. came in at 3.43 inches, or 0.91 inch above normal. This is the second wettest April on record.
- 3) According to the U.S. Drought Monitor, 5.0% of the contiguous U.S. was in drought.

Global Highlights for April 2017

- 1) The average temperature across global land and ocean surfaces for April 2017 was the 2nd warmest April in the entire period of record.
- 2) The April globally averaged sea surface temperature was 1.31°F above the 20th century average. This is the second highest global ocean temperature for April throughout the period of record.
- 3) ENSO neutral conditions were present in April 2017 and are now expected to continue for the remainder of the summer.

U.S. & Global Climate Highlights (May): The latest [U.S.](#) and [global](#) climate highlights for May 2017 are now available. A few points for you to take home are provided below.

U.S. Selected Significant Climate Anomalies and Events for May and Spring 2017

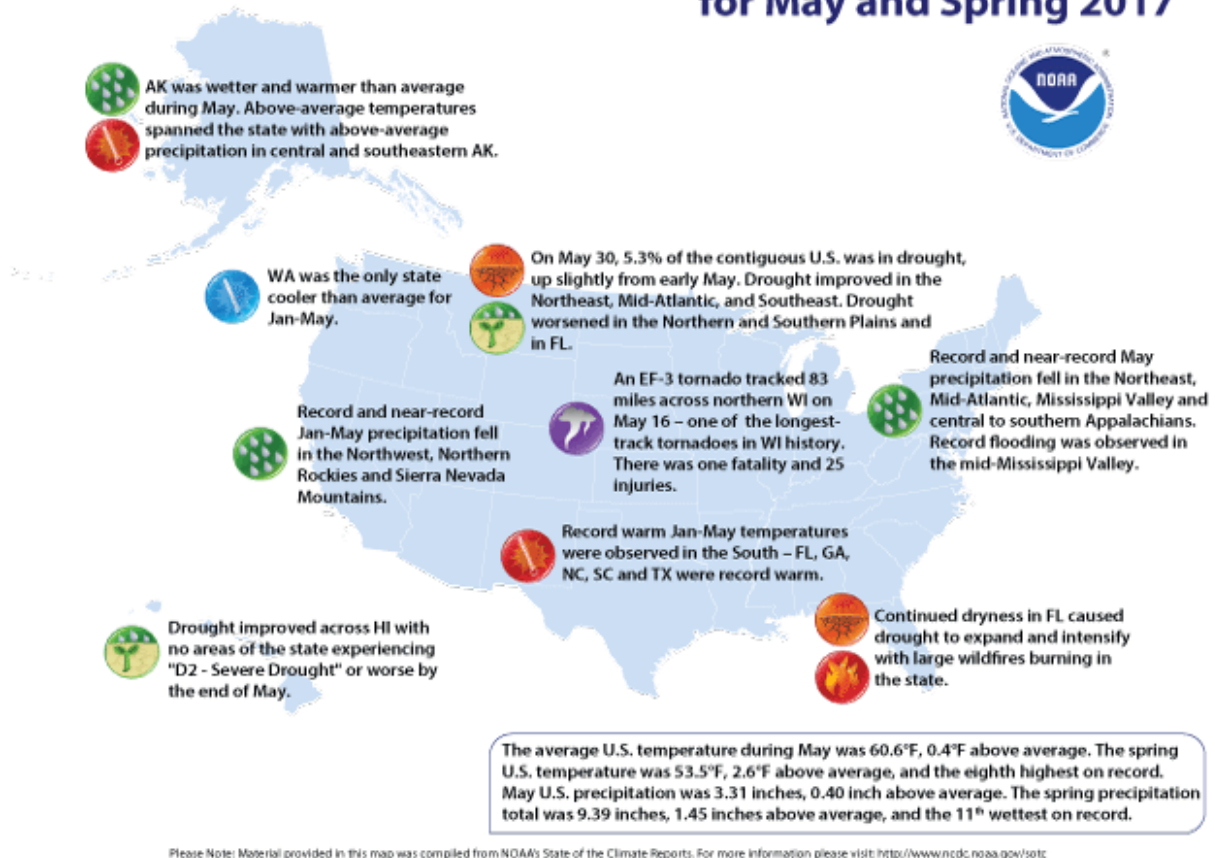


Figure 5: Highlights of U.S. climate events for May 2017.

U.S. Highlights for May 2017

- 1) The contiguous U.S. average temperature for May 2017 was 60.6 °F, ranking somewhere in the middle of the period of record.
- 2) The average May precipitation total for the contiguous U.S. came in at 3.31 inches, or 0.40 inch above normal. This ties with 2009 for the 25th wettest in the record books.
- 3) According to the U.S. Drought Monitor, 5.3% of the contiguous U.S. was in drought. This continues near-record low levels of drought which began in April.

Global Highlights for May 2017

- 1) The average temperature across global land and ocean surfaces for May 2017 was the 3rd warmest May in the entire period of record.
- 2) The April globally averaged sea surface temperature was 1.28°F above the 20th century average. This is the third highest global ocean temperature for May throughout the period of record.
- 3) ENSO neutral conditions were present in May 2017 and are now expected to continue for the remainder of the summer and into the fall.

April Report of Hydrologic Conditions by Greg Forrester, Lead Forecaster at NWS Glasgow:

April was a drier than normal month across northeast Montana. The wet spots were Terry with 1.39 inches, Mildred with 1.36 inches, and Flatwillow with 1.30 inches. The dry spots were Raymond with 0.04 inch, Brockton 17N with 0.05 inch, and Vida with 0.12 inch. Glasgow received 0.52 inch which was 61 percent of normal.

Temperatures were near normal. Glasgow averaged 45.4 degrees which was 0.5 degrees above normal.

Stream flow on the Milk, and Poplar Rivers was above normal for the entire month. The Missouri River had near normal stream flow the entire month. The Yellowstone River had well above normal stream flow for the entire month.

The Fort Peck Reservoir elevation rose to 2237.2 feet. The reservoir was at 84 percent of capacity and 105 percent of the mean pool.



May Report of Hydrologic Conditions by Greg Forrester, Lead Forecaster at NWS Glasgow:

May was a very dry month across northeast Montana with most locations receiving less than 50 percent of their normal precipitation. Medicine Lake had its driest May on record with 0.10 inch of precipitation. Records there go back to 1911. The wet spots were Carlyle with 1.37 inches, Zortman with 1.35 inches, and Wibaux with 1.09 inches. The dry spots were Brockway and Raymond with 0.02 inch, Medicine Lake with 0.10 inch, and Circle with 0.20 inch. Glasgow received 0.58 inch which was 30 percent of normal.

Temperatures were a few degrees above normal. Glasgow averaged 55.1 degrees which was 1.5 degrees above normal.

Stream flow on the Milk and Poplar Rivers was below normal for the entire month. The Missouri River had near normal stream flow the entire month. The Yellowstone River had well above normal stream flow for the entire month due to mountain snow melt upstream.

The Fort Peck Reservoir elevation rose to 2239.12 feet. The reservoir was at 86 percent of capacity and 107 percent of the mean pool.



Links You May Like:

[Historic Balloon Launch 50 Years Ago](#)

[Turning Up The Heat!](#)

[Summer & Severe Weather](#)

[June ENSO Update](#)

[NOAA's 2017 Atlantic Hurricane Outlook](#)

May and June 2017—Abnormally Dry Across the Region (by Victor Proton, Lead Forecaster):

Apart from precipitation, evapotranspiration is the major component in the hydrologic budget. Evapotranspiration involves the process of evaporation from open bodies of water, wetlands, snow cover, and bare soil and the process of transpiration from vegetation. The principle climatic factors influencing evapotranspiration are solar radiation and wind speed. In the conterminous United States, evapotranspiration averages about 67 percent of the average annual precipitation and ranges from 40 percent of the precipitation in the Northwest and Northeast to about 100 percent of the precipitation in the Southwest. Here in Northeast Montana it is about 80 percent of the normal precipitation.

In May and June 2015 the Glasgow area received less than 20% of normal precipitation for the 60 day period. The compounding factor was that the amount of incoming solar radiation was above normal, along with higher than average wind speeds. This resulted in the month of May of a net loss of 8.028 inches of water from the ground, and then during the months of May and June since Glasgow receives the largest share of its annual precipitation in these months. This has brought on a flash drought for northeast Montana, and the long range forecast does not show significant relief any time soon.

Precipitation Data (April):

Station	Precipitation	Location
BAYM8	0.66	Baylor
BRDM8	0.62	Bredette
BTNM8	0.05	Brockton 17 N
BKNM8	0.68	Brockton 20 S
BKYM8	0.86	Brockway 3 WSW
BRSM8	0.95	Brusette
CLLM8	0.47	Carlyle 13 NW
CIRM8	0.70	Circle
CHNM8	0.53	Cohagen
CNTM8	0.54	Content 3 SSE
CULM8	0.11	Culbertson
DSNM8	0.57	Dodson 11 N
FLTM8	1.30	Flatwillow 4 ENE
FPKM8	0.21	Fort Peck PP
GLAM8	M	Glasgow 14 NW
GGWM8	0.52	Glasgow WFO
GGSM8	0.79	Glasgow 46 SW
GNDM8	0.96	Glendive WTP
HRBM8	0.40	Harb
HINM8	0.44	Hinsdale 4 SW
HNSM8	0.30	Hinsdale 21 SW
HOMM8	0.28	Homestead 5 SE
HOYM8	1.00	Hoyt
JORM8	0.50	Jordan
LNDM8	0.93	Lindsay
MLAM8	1.19	Malta
MLTM8	0.83	Malta 7 E
MTAM8	0.61	Malta 35 S

Station	Precipitation	Location
MDCM8	0.59	Medicine Lake 3 SE
MLDM8	1.36	Mildred 5 N
MSBM8	1.18	Mosby 4 ENE
OPNM8	0.72	Opheim 10 N
OPMM8	0.39	Opheim 12 SSE
PTYM8	0.98	Plentywood
POGM8	0.52	Port of Morgan
RAYM8	0.04	Raymond Border Station
SAOM8	0.58	Saco 1 NNW
SMIM8	0.15	St. Marie
SAVM8	0.74	Savage
SCOM8	1.13	Scobey 4 NW
SDYM8	0.78	Sidney
SIDM8	0.72	Sidney 2S
TERM8	1.39	Terry
TYNM8	M	Terry 21 NNW
VIDM8	0.12	Vida 6 NE
WSBM8	0.46	Westby
WTRM8	0.74	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	0.79	Wibaux 2 E
WTTM8	1.24	Winnett
WNEM8	0.77	Winnett 6 NNE
WNTM8	1.82	Winnett 8 ESE
WITM8	1.07	Winnett 12 SW
WLFM8	0.25	Wolf Point
ZRTM8	1.15	Zortman

Precipitation Data (May):

Station	Precipitation	Location
BAYM8	0.52	Baylor
BRDM8	0.49	Bredette
BTNM8	0.00	Brockton 17 N
BKNM8	0.48	Brockton 20 S
BKYM8	0.02	Brockway 3 WSW
BRSM8	0.49	Brusette
CLLM8	1.37	Carlyle 13 NW
CIRM8	0.20	Circle
CHNM8	0.19	Cohagen
COHM8	0.81	Cohagen 22SE
CNTM8	0.29	Content 3 SSE
CULM8	0.78	Culbertson
DSNM8	0.42	Dodson 11 N
FLTM8	1.14	Flatwillow 4 ENE
FPKM8	0.38	Fort Peck PP
GLAM8	0.37	Glasgow 14 NW
GGWM8	0.58	Glasgow WFO
GGSM8	0.32	Glasgow 46 SW
GNDM8	0.75	Glendive WTP
HRBM8	0.20	Harb
HINM8	0.52	Hinsdale 4 SW
HNSM8	0.55	Hinsdale 21 SW
HOMM8	0.36	Homestead 5 SE
HOYM8	0.22	Hoyt
JORM8	0.22	Jordan
LNDM8	0.20	Lindsay
MLAM8	0.84	Malta
MLTM8	0.66	Malta 7 E
MTAM8	0.32	Malta 35 S
MDCM8	0.10	Medicine Lake 3 SE
MLDM8	1.47	Mildred 5 N

Station	Precipitation	Location
MSBM8	0.29	Mosby 4 ENE
OPNM8	0.82	Opheim 10 N
OPMM8	0.33	Opheim 12 SSE
PTYM8	0.40	Plentywood
POGM8	0.07	Port of Morgan
RAYM8	0.02	Raymond Border Station
SAOM8	0.27	Saco 1 NNW
SMIM8	0.59	St. Marie
SAVM8	0.70	Savage
SCOM8	0.72	Scobey 4 NW
SDYM8	1.01	Sidney
SIDM8	0.73	Sidney 2S
TERM8	0.84	Terry
TYNM8	M	Terry 21 NNW
VIDM8	0.22	Vida 6 NE
WSBM8	0.18	Westby
WTRM8	0.58	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	1.09	Wibaux 2 E
WTTM8	0.40	Winnett
WNEM8	0.71	Winnett 6 NNE
WNTM8	0.49	Winnett 8 ESE
WITM8	0.36	Winnett 12 SW
WLFM8	0.43	Wolf Point
ZRTM8	1.35	Zortman


Drought Reminder:



Monthly Trivia: Last month we asked...

How hot is lightning? Read next month's newsletter to find out the answer to this one!

Answer: Since lightning is the movement of electrical charges, it technically does not have a temperature. However, the "stuff" that lightning passes through can heat up. If something is a poor conductor of electricity, such as air, it will become extremely hot when lightning makes a pass through it. Lightning can heat the air that it passes through to 5 times hotter than the surface of the sun—upwards of 50,000 °F! Read more [here](#).

 **New Question:** This summer when you're out and about looking at mature thunderstorms off in the distance, you might be wondering if it may be heading toward or away from you. How can you tell which way the storm is moving?

May 2017 Summary (Glasgow, MT)

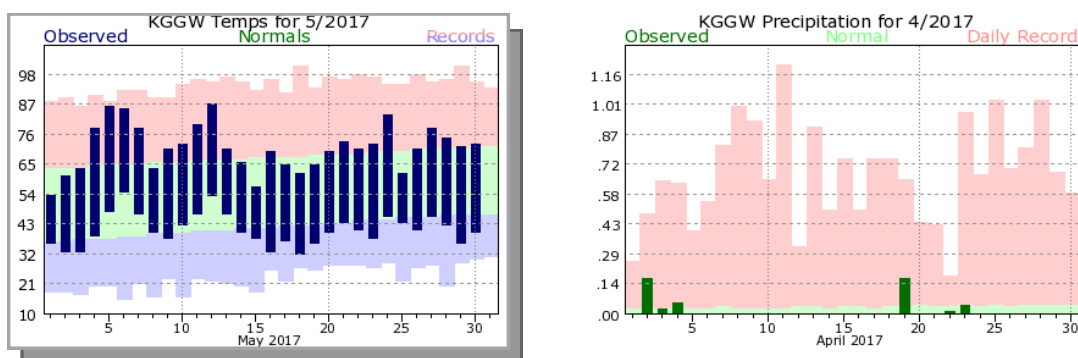


Figure 6: Observed temperatures for Glasgow relative to records and normal (left) and observed precipitation for Glasgow relative to records and normal (right) in May 2017.

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